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10/593,187

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Frederique Cordelle

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ANDERSON, KILL & OLICK, P.C.  
1251 AVENUE OF THE AMERICAS  
NEW YORK,, NY 10020-1182

EXAMINER

CULLEN, SEAN P

ART UNIT

PAPER NUMBER

1795

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,187	<b>Applicant(s)</b> CORDELLE ET AL.	
	<b>Examiner</b> Sean P. Cullen	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/21/2006</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed December 12, 2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the foreign patent document, EP 403947, which does not have a corresponding copy of the document as required, referred to therein has not been considered.

### ***Claim Objections***

2. Claims 10 and 12 is objected to because of the following informalities:

In line 3 of claim 12, the reference character "11" refers to a compact zone. In line 2 of claim 10, the reference character "20" refers to a bipolar plate. Reference characters are not included throughout the remainder of claims. For claim language consistency, claims should include all reference characters or no reference characters.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 16 recites the limitation "the cathode" in line 3 and "the anode" in line 4. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-8, 16-17 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hado et al. (KR1020040014273, see machine translation).

Regarding claim 1, Hado et al. discloses an individual cell for a fuel cell (Fig. 5) comprising:

- a first and a second electrode layers (see anode and cathode, P6/L44-P7/L3) enabling gas transfer and respectively having a first and a second porosities (see B, P3/L39-P4/L2),
- a solid electrolyte layer (21) located between the two electrode layers (Fig. 3, P6/L38-43),
- the two electrode layers consisting of an anode and a cathode (see anode and cathode, P6/L38-43),
- the first electrode layer (Fig. 5) comprising at least a first compact zone (23A, see A, P3/L39-P4/L2) with a third porosity (P3/L39-P4/L2),

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- the third porosity (see A, P3/L39-P4/L2) being lower than the first porosity (see B, P3/L39-P4/L2),
- characterised wherein a first compact zone (23A) is composed of the densified material (see compressed, P6/L44-P7/L3) from which the electrode including the said zone is made (P6/L44-P7/L3).

Regarding claim 2, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- the first electrode layer (Fig. 3) has a first thickness (22A) and
- a first compact zone (23A) has a thickness identical to the first thickness (the joint of 22A and 23A have same thickness, Fig. 3).

Regarding claim 3, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- wherein the second electrode layer (Fig. 3) comprises at least a second compact zone (23B) with a fourth porosity (P3/L39-P4/L2),
- the fourth porosity (see A, P3/L39-P4/L2) being lower than the second porosity (see B, P3/L39-P4/L2).

Regarding claim 4, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- wherein the second electrode layer (Fig. 3) has a second thickness (22B), and
- a second compact zone (23B) has a thickness identical to the second thickness (the joint of 22B and 23B have same thickness, Fig. 3).

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Regarding claim 5, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- wherein the first electrode layer (Fig. 3) has a first thickness (22A) and
- a first compact zone (23A) has a thickness identical to the first thickness (the joint of 22A and 23A have same thickness, Fig. 3).

Regarding claim 6, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- wherein a second compact zone (23B) is composed of the densified material (see compressed, P6/L44-P7/L3) from which the electrode including the said zone is made (P6/L44-P7/L3).

Regarding claim 7, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- at least one bipolar plate (24A) adjacent to an electrode layer (Fig. 3).

Regarding claim 8, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- two bipolar plates (24A and 24B) adjacent to each electrode layer (Fig. 3).

Regarding claim 16, Hado et al. discloses all claim limitations set forth above and further discloses an individual cell:

- comprising at least a first gas inlet (25A) on the cathode (Fig. 3) such that the entire area of the anode (Fig. 3) adjacent to each first gas inlet (25A) is a compact area (23B) of the anode (Fig. 3)

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- at least a second gas inlet (25B) on the anode (Fig. 3) such that the entire area of the cathode (Fig. 3) adjacent to each second gas inlet (25B) is a compact area (23A) of the cathode (Fig. 3).

Regarding claim 17, Hado et al. discloses all claim limitations set forth above and further discloses a fuel cell comprising:

- a stack of cells (P7/L23-30)
- each cell being separated from its neighbour by a bipolar plate (24A and 24B, P7/L23-30).

Regarding claim 19, Hado et al. discloses an individual cell comprising:

- an anode layer (see anode, P6/L44-P7/L3),
- a cathode layer (see cathode, P6/L44-P7/L3),
- a solid electrolyte layer (21) located between the anode layer (see anode, P6/L44-P7/L3) and the cathode layer (see cathode, P6/L44-P7/L3, Fig. 3),
- a bipolar plate (24A and 24B) adjacent to each of the anode and cathode layer (Fig. 3),
- each of the anode and cathode layer comprising a dense zone (22A and 22B) having a thickness equal to the thickness of the corresponding anode and cathode layer (the joint of 22A-B and 23A-B have same thickness, respectively, Fig. 3)
- the porosity of the dense zone (22A and 22B) being larger than the porosity of the corresponding anode and cathode layer(see A and B, P3/L39-P4/L2),

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- the dense zone (22A and 22B) comprising a cavity (23A and 23B) wherein a corresponding protuberance (26A and 26B) of the adjacent bipolar plate (24A and 24B) can fit (Fig. 3).

Regarding claim 20, Hado et al. discloses all claim limitations set forth above and further discloses:

- comprising gas inlets (25A and 25B) for one of the anode and cathode located in dense zones (22A and 22B) of the other anode and cathode (Fig. 3).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any



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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 9-12 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hado et al. (KR1020040014273, see machine translation) as applied to claims 7 and 17 above, in view of Bram et al. (WO 03032420, see machine translation).

Regarding claim 9, Hado et al. discloses all claim limitations set forth above, but does not explicitly disclose an individual cell:

- wherein the bipolar plate has a coefficient of thermal expansion higher than the coefficient of thermal expansion of the adjacent electrode layer and the electrolyte layer.

Hado et al. discloses the bipolar plate, the electrode layer and the electrolyte layer (P6/L38-43), but is silent on their coefficient of thermal expansion. Bram et al., discloses, in a fuel cell, the coefficient of thermal expansion of the bipolar plate is higher than the coefficient of thermal expansion of the electrode layer and the electrolyte layer is conventional in the art (P2/L24-28). Hado et al. and Bram et al. are analogous art because they are directed to fuel cells. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make fuel cell of Hado et al. using the materials of Bram et al. as the said materials were conventional in the art. It would amount to nothing more than using of a known material for its intended use in a known environment to accomplish an entirely predictable result.

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Regarding claim 10, modified Hado et al. discloses all claim limitations set forth above and Hado et al. further discloses an individual cell:

- wherein the bipolar plate (24A and 24B) is connected to the adjacent electrode layer by nesting (Fig. 3).

Regarding claim 11, modified Hado et al. discloses all claim limitations set forth above and Hado et al. further discloses an individual cell:

- wherein the bipolar plate (24A and 24B) comprises at least a protuberance (26A and 26B) and
- the adjacent layer (Fig. 3) comprises a cavity (23A and 23B),
- said protuberance (26A and 26B) of the bipolar plate (24A and 24B) and the cavity (23A and 23B) fitting one into the other (Fig. 3).

Regarding claim 12, modified Hado et al. discloses all claim limitations set forth above and Hado et al. further discloses an individual cell:

- wherein the cavity (23A and 23B) is located in a compact zone of the electrode layer (Fig. 3, P6/L44-P7/L3).

Regarding claim 14, modified Hado et al. discloses all claim limitations set forth above and Hado et al. further discloses an individual cell:

- wherein the cavity (23A and 23B) is larger in width than the width of the protuberance (26A and 26B) of the bipolar plate (24A and 24B).

Regarding claim 15, modified Hado et al. discloses all claim limitations set forth above and Hado et al. further discloses an individual cell:

- comprising a plurality of cavities (23A and 23B, Fig. 3).

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11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hado et al. (KR1020040014273, see machine translation) as applied to claim 17 above, in view of Cable et al. (U.S. 5,445,903).

Regarding claim 18, Hado et al. discloses all claim limitations set forth above, but does not explicitly disclose a fuel cell:

- with a circular plane geometry.

Hado et al. places not limitations on the geometry of said fuel cell. Cable et al. discloses a fuel cell with a circular plane geometry (Fig. 3) to form a compact fuel cell. Hado et al. and Cable et al. are analogous art because they are directed to fuel cells. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make fuel cell of Hado et al. using the circular plane geometry of Cable et al. to form a compact fuel cell.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hado et al. (KR1020040014273, see machine translation) in view of Bram et al. (WO 03032420, see machine translation) as applied to claim 12 above, in further view of Cable et al (U.S. 5,445,903).

Regarding claim 13, modified Hado et al. discloses all claim limitations set forth above, but does not explicitly disclose an individual cell:

- wherein the cavity is located in a protuberance of the electrolyte layer.

Cable et al. discloses a protuberance (7 and 8) composed of ceramic impervious to fuel at elevated temperatures (C4/L13-22) to seal the gas inlet from the electrodes (C4/L13-22).

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Although Cable et al. does not explicitly disclose the protuberance of the electrolyte. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the gasket from the electrolyte to reduce the number of parts in the fuel cell. Hado et al. and Cable et al. are analogous art because they are directed to fuel cells. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the individual cell of Hado et al. using the protuberance of Cable et al. to seal the gas inlet from the electrodes.

### *Conclusion*

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./

Examiner, Art Unit 1795

/Basia Ridley/

Supervisory Patent Examiner, Art Unit 1795